

A Computational Study of the Reynolds Piped Flow Experiment

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Abstract

The study of interaction of fluid with matter assumes great significance for most engineering applications. The flow can be either turbulent or laminar, and different types of interactions arise out of these flow. In the introductory undergraduate course of fluid mechanics, a typical demonstration for these interactions is the Reynolds pipe flow experiment. Instabilities of various types like vibrations, dust cause deviations from the pictures shown in the textbook. We have used simulations in COMSOL Multiphysics ® to demonstrate the Reynolds piped flow experiment. We have used the inbuilt facilities in COMSOL to simulate the dye introduction and compare it with actual experiments in the laboratory. We present simulations in COMSOL Multiphysics® to show the likely complications that can happen in laboratory apparatus and the resulting deviations from the ideal case (text book pictures).